

II.—This low area moved southward from the region north of Manitoba on the 4th; it was central in Minnesota on the afternoon of that date, and by midnight it had extended over the upper lake region and Mississippi and Missouri valleys as an elliptical area, the longer axis being nearly east and west. Light rains prevailed in the districts north of the Ohio valley and in the northwest on the morning of the 5th, when the centre of disturbance was over Lake Michigan. The elliptical form continued but the longer axis was turning toward the northeast. The afternoon report of the 5th showed that this area had divided, one area being central north of Lake Huron and one in Indian Territory, and the midnight chart exhibited three low areas, one in Arkansas, one in Illinois and one over Lake Huron, attended by rain from the Gulf coast northward to the lake region. The succeeding report of the 6th indicated that these secondary areas had united in the central Ohio valley and again separated, the principal area moving to the north of the lake region, and the secondary disturbance passing to the south Atlantic coast and thence northeasterly. The principal area, when central over Lake Superior, increased greatly in energy, owing to the advance of high area number ii., and severe gales occurred on the upper and lower lakes, attended by general rains or snow at the northern stations. During the 8th and 9th, after passing northward from the Ohio valley, this storm apparently moved slightly to the westward before taking up the usual northeasterly course. It increased in area and lost energy after leaving the lake region and disappeared to the northeastward on the 10th.

III.—This storm was at no time within the limits of the stations of observation, but its movement along the Atlantic coast from the 12th to the 15th can be approximately traced from barometric changes observed, and the direction and velocity of wind at the coast stations. Very heavy rains occurred on the North Carolina coast on the night of the 12th, and severe northerly gales were reported from this coast on the 13th. These gales extended over the middle Atlantic and southern New England coasts on the 14th, the wind reaching a velocity of fifty miles northeast at Block Island, Rhode Island, and forty-four miles at Boston, Massachusetts, between afternoon and midnight of the 14th. The succeeding reports of the 15th indicate that this storm did not pass over the Atlantic, but that it disappeared by gradual rise in the barometer, when the centre was near Nova Scotia.

IV.—This low area resulted from an extended depression covering the mountain districts during the 12th, 13th, and 14th. There was a gradual movement of this extended low area to the eastward and by the afternoon of the 15th the trough of low pressure extended from Texas northward to the British possessions. Two areas of depression were well defined on the midnight weather chart of the 15th, one central in northeastern Dakota and the other central in Kansas. This storm was accompanied by very heavy rains in the central Missouri valley and eastern Dakota on the 15th. It moved directly northeast and passed north of the lake region, disappearing during the 16th, attended by strong south to west winds in the upper lake region.

V.—This storm probably originated in the southwest and although its centre cannot be located at each consecutive tri-daily report, it is probably a development of a secondary area referred to in number iv. It is first marked as central in Iowa on the morning of the 17th. The barometer was low in all districts from the lower Mississippi valley westward to the Pacific coast and it was lowest in Arizona, but the winds in the northwest indicated the development of this storm which passed eastward from Iowa over the lake region, attended by light rain in the northern states and light to fresh winds in the lake region. This depression increased in size as it approached the coast, the barometer remaining about stationary and the winds becoming light and variable. It disappeared in the northeast with indications of decreasing energy.

VI.—This disturbance was first marked as central north of Dakota on the afternoon of the 22d; it had previously ex-

tended over the mountain districts to the westward, and it probably originated on the Pacific coast. It remained north of Minnesota until the afternoon of the 23d, when it moved southward to southern Minnesota, the depression being in form of a barometric trough extending southward to Texas, inclosed between high areas which covered the Atlantic coast and the Rocky mountain districts. The morning report of the 24th shows three minor depressions within this barometric trough, one central in Indian Territory, one in southern Minnesota, and the third northeast of Manitoba. These minor depressions disappeared during the 24th, apparently uniting with the central disturbance and passing over the upper lake region to the northeast, accompanied by fresh and brisk winds in the lake region, and general rains in the northern and local rains in the southern states. This storm continued its course northeastward north of the Saint Lawrence valley during the 25th and 26th with decreasing pressure at the centre, but without causing severe gales, owing to the slight gradient which was due to the extension of the low area.

VII.—Previous to the development of this disturbance in the central Missouri valley on the afternoon of the 28th, the barometer had been low in the region south of Nebraska and Wyoming, and the reports indicate that a depression with slight energy moved from Colorado eastward to the Missouri valley during the 27th; when the centre was located near Yankton, Dakota, on the afternoon of the 28th, the depression extended southeastward to the lower Ohio valley and a secondary disturbance, which had disappeared at the succeeding report, appeared to be central in Missouri. The storm moved southeastward over the Mississippi valley, causing general rains in all districts and strong north to east winds on the west Gulf coast. It was elliptical in form and enclosed by the isobars for 29.7, 29.8, and 29.9, on the morning of the 29th, when central near Keokuk, Iowa. This general form continued during the two succeeding reports, when the storm-centre reached its most southerly point, near Champaign, Illinois, after which it moved rapidly northeastward to the Saint Lawrence valley, where it was central at the close of the month as a depression of slight energy.

NORTH ATLANTIC STORMS DURING MAY, 1885.

[Pressure expressed in inches and in millimetres; wind-force by scale of 0-10.]

The paths of the depressions that have appeared over the north Atlantic ocean during the month are determined, approximately, from international simultaneous observations furnished by captains of ocean steamships and sailing vessels; abstracts of ship's logs and other data collected by the Signal Service agencies at the ports of New York, Boston, and Philadelphia; reports furnished through the co-operation of the "New York Herald Weather Service," and from other miscellaneous data received at this office up to June 21st, 1885.

Of the ten depressions shown on the chart, that traced as number 8 appears to have been a continuation of a storm which entered the Atlantic from the North American continent; number 5 appeared off the South Carolina coast on the 10th, and dispersed on the following day when south of Nova Scotia; numbers 3 and 4 developed over the Banks of Newfoundland and occupied mid-ocean during the first decade of the month, finally disappearing in the neighborhood of the Azores; number 10 appeared near N. 50°, W. 40°, on the 28th, and may have been a continuation of a disturbance which left the Labrador coast on the 26th, its centre, on the 27th, being far beyond the limits of the marine observations. Numbers 2 and 9 appeared between N. 45° and 50° and W. 30° and 35°; the former moving eastward to the Bay of Biscay and the latter northeastward beyond N. 55°, W. 20°. The remaining depressions, numbers 1, 6, and 7, appeared between W. 20° and the British coasts, having apparently approached from the northwestward.

The general direction of movement of the storm-centres during May, 1885, was east-northeasterly, excepting those which appeared first near the British coasts; these moved southeastward. During the first and last decades of the month the at-

mospheric pressure over the Atlantic, between the fortieth and fiftieth parallels was comparatively low, and strong breezes to gales with generally unsettled weather prevailed; during the second decade areas of high pressure occupied the above-mentioned region, and generally pleasant weather was reported. The severest storms of the month occurred during the passage of the depressions traced as numbers 3, 4, and 9. Dense fogs prevailed over the region from W. 40° to the American coasts.

The following are descriptions of the depressions charted:

1.—This depression appeared on the 1st, near W. 20°; on that date the s. s. "City of Chicago," F. Watkins, commanding, in N. 50° 48', W. 20° 30', had a w. gale of force 7, with barometer reading 29.28 (743.7), and the bark "Alpha," Ole Gränn, commanding, in N. 57° 20', W. 23° 20', had barometer 29.5 (749.3), wind ne., force 5, squally weather; at the same time strong sw. to w. breezes or moderate gales prevailed over the English channel and south of Ireland. On the 2d, the storm-centre was off the Irish coast with lowest reported pressure 29.24 (742.7); during the day the disturbance moved south-eastward and on the 3d was central to the southwest of Ireland, attended by strong nw. and w. winds in the southwest quadrant; during its progress the winds shifted to east over the British Isles and to south and southwest over the Bay of Biscay and along the French coasts. On the 4th the depression apparently entered northern France.

2.—This depression was shown near N. 47°, W. 34° on the 3d; it moved slowly eastward during the 4th, the barometer ranging from 29.65 (753.1) to 29.75 (755.6), and by the 5th the centre of disturbance had reached N. 47°, W. 17°, where the pressure was below 29.55 (750.6). On the 6th the depression occupied the Bay of Biscay, the pressure near the centre being less than 29.4 (746.7). During the passage of this depression the wind did not exceed the force of a moderate to strong breeze.

3.—During the 2d and 3d, a storm of considerable energy (low area i.) passed northward over the Maritime Provinces and the Gulf of Saint Lawrence, causing a decrease of pressure over the ocean eastward to the Banks of Newfoundland. After its passage the pressure over the Banks varied from 29.55 (750.6) to 29.7 (754.4), with moderate to strong w. and sw. winds and unsettled weather. By the morning of the 5th a storm-centre had developed and taken up an easterly movement and was then near N. 45°, W. 40°; the s. s. "Baltic," R. E. Bence, commanding, in N. 45° 10', W. 41° 30', had barometer 29.52 (749.8), with light variable winds and showery weather, while the s. s. "Fulda," O. Heimbrück, commanding, in N. 44° 1', W. 42° 16', had a w. gale of force 7, with barometer 29.6 (751.8). Vessels to the eastward of the thirty-ninth meridian had east and southeast winds, blowing with the force of a strong breeze to moderate gale. On the 6th the centre of this depression was apparently near N. 35°, but after this date it became ill-defined and the disturbance probably merged in number 4, an important and extensive depression which was moving eastward from the Banks and south of the track of number 3.

4.—This disturbance, which was attended by some of the heaviest gales of the month, appeared as a well-defined storm-centre on the 6th, near N. 42°, W. 50°, with the barometer down to 29.0 (736.6).

The following are some of the reports relating thereto:

The s. s. "Rhyndland," J. C. Jamison, commanding, reported: "at 11 h. 29 m. on May 5th (Greenwich date and time), the barometer read 29.6 (751.8), moderate gale from nne., increasing rapidly to a hurricane; at 15 h. 26 m., barometer 29.4 (746.2), nne. hurricane with terrific squalls of hail and torrents of rain; very high, confused sea, sweeping the decks fore and aft; thunder and lightning almost continuous. Kept the ship (sse.) before the dominating nnw. sea, the masts, yards, and all the rigging being bright with electricity; each mast-head and all the yard-arms showed a brilliant ball of light, which continued for four hours. At 18 h. 10 m., in N. 40° 27', W. 50° 54', the barometer read 29.2 (741.7); wind and sea hauling to nnw., weather

continuing same as before, with thick fog or mist. At 20 h. lightning struck the funnel twice at an interval of about five minutes, resembling in sound a volley of musketry, and throwing out a cluster of balls of fire which drifted off to leeward and were visible for at least five seconds; on examination of the funnel it was found that both steam pipes and steam whistle were covered with sulphur. From 21 h., on May 5, to 3 h. on May 6th, weather gradually moderating and clearing; at 8 h. on the 6th barometer 29.27 (743.4), strong nw. gale, high sea."

The s. s. "Circassia," A. Campbell, commanding, in N. 42° 29', W. 47° 25', had lowest barometer, 29.07 (738.4), at 8 p. m., on the 6th, the gale commencing at n. by w., and veering to ne. and ene.

The s. s. "Germanic," C. W. Kennedy, commanding, had lowest barometer, 28.86 (733.0), at noon of the 6th; gale of force 9, beginning at ss., and veering to wnw., and then backing to sw., s., se., e. ne., and n. by e.

The s. s. "Tyrian," F. Hassenstein, commanding, reported strong sw. winds during the forenoon, with vivid lightning in the sw.; at 4 p. m. wind backed to se., and then to ne., barometer, 29.03 (737.3); (position at noon N. 42° 18', W. 47° 0').

The s. s. "Samaria," F. Dutton, commanding, had moderate w. winds in the early morning, with rain at 8 a. m.; at noon, strong se. wind and heavy rain; 4 p. m., moderate gale and cloudy; 9 p. m., heavy rain and strong gale; lowest barometer, 29.1 (739.1), at 11 p. m., in N. 43° 00', W. 46° 00'; after this, weather moderating, strong ne. winds.

Vessels to the westward of the centre had strong nw. gales; the s. s. "City of Chicago," F. Watkins, commanding, in N. 42° 30', W. 53° 15', reported barometer 29.26 (743.2); nw. gale, lasting from 1 a. m., of the 6th till 4 a. m., of the 7th, and the s. s. "Holland," Wm. Tyson, commanding, in N. 41° 15', W. 48° 50', had barometer, 29.1 (739.1), wind n. by w., force 9.

On the 7th, the storm-centre was near N. 40°, W. 46°, where the lowest pressure was 29.18 (741.2), observed on board the s. s. "Weser," H. Bruus, commanding, in N. 39° 59', W. 46° 43', winds from wnw. to nw. and w., moderate to strong gale.

During the 8th and 9th, the disturbance moved slowly eastward, with steadily increasing pressure and an abatement in the force of the winds, which had now moderated to strong breezes or moderate gales.

On the 10th, the depression was shown near N. 44°, W. 28°, the pressure having increased to 29.7 (754.4), and the ocean to the eastward was apparently occupied by an area of high pressure.

5.—This depression appeared off the coast of the Carolinas during the night of the 9th, and on the morning of the 10th its centre was near Cape Hatteras; the s. s. "Ivanhoe," J. Cameron, commanding, apparently crossed the track of the depression and reported moderate w. winds and heavy rain at 7 p. m. of the 9th, backing to strong sw. gale and continuing until 2 a. m. of the 10th, when it suddenly changed to nne. and continued until 2 p. m. after which it lulled; the lowest barometer reading was 29.7 (754.4) at 4 a. m. of the 10th, in N. 34° 22', W. 74° 18'. The barkentine "Bonny Doon," J. S. Cole, commanding, in N. 37° 11', W. 74° 24', at 7 a. m. of the 10th, had barometer 29.66 (753.4), wind nne. force 6, cloudy. The pressure increased as the disturbance moved northeastward, and by the 11th, it was shown near N. 39°, W. 63°, where the pressure was 29.85 (758.2); the chart for the following day indicated that the depression had filled in.

6.—This was a slight depression which appeared off the southwest coast of Ireland on the 13th, and apparently moved southeastward over the Bay of Biscay during the day; the lowest reported pressure on the 13th was 29.7 (754.4), and moderate nnw. to ne. gales occurred between W. 10° and 15°.

7.—This depression apparently approached the British coasts from the northwest on the 20th. The s. s. "Zaandam," E. M. Chevalier, commanding, in N. 49° 31', W. 16° 51', at 11 a. m. of the 20th, had barometer 29.49 (749.0), strong gale from w. to wnw.; the s. s. "Australia," A. McRitchie, commanding, in about N. 48° 54', W. 12° 8', reported at 4 a. m. on

the 20th barometer 29.6 (751.8); 8 a. m., 29.54 (750.3), strong breeze with heavy squalls of rain and hail; noon, barometer 29.48 (748.8), moderate to fresh wnw. gale with hard squalls of hail and sleet; 4 p. m., 29.32 (744.7), weather same, wind w. by s.; 7 p. m., 29.26 (743.2), breeze moderating; 10 p. m., 29.32 (744.7), strong breeze with passing showers; midnight, moderate breeze and clear weather, barometer 29.34 (745.2). The s. s. "Weser," H. Bruns, commanding, had lowest barometer, 29.32 (744.7) at midnight of the 20th in N. 50° 4', W. 5° 12', moderate gale from sw. to w. by s. During the 20th the depression entered Ireland, and by the 21st it occupied the British Isles and the North Sea.

8.—This was probably a continuation of the depression described as low area v. under "Areas of low barometer." It passed over the Maritime Provinces during the afternoon of the 19th, and on the 20th it was shown as a shallow depression over Newfoundland, with pressure about 29.8 (756.9). It moved slowly eastward, with nearly stationary pressure, but attended by moderate n. and nw. gales in its rear, until the 25th, when it appeared off the west coast of Ireland, the pressure near the centre being about 29.55 (750.6).

9.—This depression, which displayed much energy during its progress, first appeared on the 25th in the region north of 50° N., and west of 30° W. At midnight of that date the s. s. "Celtic," B. Gleadell, commanding, in N. 48° 22', W. 36° 7', had barometer down to 29.5 (749.3), fresh gale from w., veering to nw. and nnw.

On the 26th the storm-centre was clearly defined near N. 49°, W. 27°, the pressure having decreased to 29.0 (736.6), while strong gales were blowing in all quadrants of the depression. The following reports show the violence of the storm.

The s. s. "Spain," W. A. Griffiths, commanding, reported: May 26th, at 13 hrs. 25 m. (Greenwich mean time), in N. 50° 00', W. 23° 11', barometer 29.41 (747.8), wind se., force 5; 20 hrs., barometer 29.12 (739.6), wind sw., force 6; 22 hrs., barometer 29.02 (737.1), wind se., force 6, light rain. On the 27th, at 2 hrs., the barometer read 28.91 (734.3), wind n., force 7, light rain; 3 hrs. 35 m., barometer 28.83 (732.3), wind nne., force 8, light rain; 4 hrs., barometer rising slowly and weather clearing; at 13 hrs. 45 m., in N. 48° 50', W. 30° 59', barometer 29.21 (741.9), wind n.

The s. s. "Wyoming," C. L. Rigby, commanding, reported: 26th, 8 a. m. (ship's time), in N. 50° 28', W. 21° 36', barometer 29.67 (753.6), light sw. breeze, cloudy weather, long sw. sea-swell, barometer falling rapidly; noon, in N. 50° 17', W. 22° 56', barometer 29.45 (748.0), strong breeze with threatening appearance; 4 p. m., in N. 50° 04', W. 24° 05', barometer 29.18 (741.2), strong breeze, squally weather and very heavy rain, wind veering from se. to n. around by w.; 8 p. m., in N. 49° 50', W. 25° 14', barometer 29.0 (736.6), strong variable winds with heavy squalls of rain, wind veering around the compass; 10 p. m., N. 49° 44', W. 25° 42', barometer 28.95 (735.3), wind n. by e., strong breeze with heavy squalls of rain and wind; midnight, in N. 49° 38', W. 26° 18', barometer 29.01 (736.8) wind nnw., increasing breeze with heavy gusts. On the 27th, at 4 a. m., in N. 49° 24', W. 27° 28', the barometer read 29.14 (740.1), wind nnw., fresh gale; noon, in N. 48° 53', W. 29° 48', barometer 29.55 (750.6), gale moderating, barometer rising rapidly.

The s. s. "Etruria," J. Cook, commanding, had a nw. gale at 4 p. m. of the 26th, continuing until 4 a. m. of the 27th and ending at n.; the greatest force of the wind was estimated at 10, and occurred between 8 p. m. and midnight of the 26th; lowest barometer 29.10 (739.1), at 4 p. m. on the 26th, in N. 48° 30', W. 29° 30'. S. S. "Llandaff City," T. L. Weiss, commanding, in N. 48° 56', W. 32° 10', barometer 29.12 (739.6), wind wnw., force 8, cloudy; the s. s. "Circassia," A. Campbell, commanding, took a gale from nw. at 6 a. m. of the 26th, lasting until 6.30 p. m.; the lowest barometer was 29.12 (739.6) at 4 a. m., in N. 51° 30', W. 34° 30'.

On the 27th the storm centre remained between W. 20° and

25° and near N. 50°; the strong gales continuing over the ocean as far westward as the thirtieth meridian. The s. s. "Jan Breydel," H. Meyer, commanding, reported barometer 29.02 (737.1) at 2 a. m. of the 27th, in N. 48° 43', W. 29° 57', whole gale from w. to nnw.; the s. s. "Saint Laurent," M. de Jousselein, commanding, in N. 48° 56', W. 26° 50', at 6 a. m. of the 27th, barometer 29.02 (737.1) wind nw., force 8. The s. s. "Assyrian Monarch," J. Harrison, commanding, in N. 49° 1', W. 19° 25', at noon of the 27th had lowest barometer 29.0 (736.6), strong gale from sw. to w. and nw.; and the s. s. "Rhyndland," J. C. Jamison, commanding, reported at 17 hrs. of the 27th, in N. 48° 48', W. 21° 23', barometer 29.11 (739.4), heavy gale from ssw. to wsw., w., and nnw., with heavy squalls of hail and rain and very heavy sea.

On the 28th the disturbance appeared to be moving to the northward and beyond the range of the observations, while the w. and sw. gales continued near the fiftieth parallel.

10.—This depression appeared to the northeastward of the Banks on the 28th; it apparently moved slowly northeastward with its centre to the northward of the fiftieth parallel. The lowest pressures reported during its progress ranged from 29.7 (754.4) to 29.8 (756.9), and the wind did not exceed the force of a strong gale:

OCEAN ICE.

On chart i. are also shown the eastern and southern limits of the north Atlantic ice-region for May, 1885. These limits are determined from reports furnished by shipmasters, and from trustworthy data published in the "New York Maritime Register" and other newspapers.

During this month the line indicating the eastern limit of the ice-region, so far as shown by the reports at hand, extends from about 50° N., 46° W., in a s. 35° e. direction, to 42° 30' N., 40° 10' W. (the easternmost iceberg); from that point the southern limit extends west-southwestward to 40° 50' N., 48° 15' W. (the southernmost icebergs), and thence west-northwestward to 41° 30' N., 53° 0' W., and from the last-mentioned position northwestward to the entrance to the Gulf of Saint Lawrence; the region most thickly studded with icebergs and field-ice being between 48° and 42° N. and from 48° to 51° W.

May, 1885, has been remarkable for the unusually large number of icebergs and field-ice reported, and for the large area of water covered by those dangers to navigation. The number of icebergs and ice-fields in May, 1885, far exceeded the numbers observed in the same month of 1883 and 1884, and has equalled, if not exceeded, the quantity observed in May, 1882. In the last-mentioned month, however, the icebergs were reported nearer the coasts, and extended along the coast of Nova Scotia, the ports from Cape Breton Island to and including Halifax, being blocked with ice at the close of the month, while in May, 1885, the principal masses of ice occupied the eastern and southern edges of the Grand Banks. In May of both 1882 and 1885 much ice was observed in the Gulf of Saint Lawrence, navigation being greatly impeded.

As compared with the preceding month (April, 1885) the eastern limit for May is about one degree to the westward of that for April, but there has been a southerly movement, the southern limit being about one degree south of that for the preceding month.

The following table shows the comparison between May, 1885, and the same month of the three preceding years:

Southern limit.			Eastern limit.		
Date.	Lat. N.	Lon. W.	Date.	Lat. N.	Lon. W.
May, 1882	40 46	47 35	May, 1882	42 40	40 00
May, 1883	40 30	47 00	May, 1883	45 40	45 12
May, 1884	41 30	47 30	May, 1884	43 30	44 50
May, 1885	40 50	48 15	May, 1885	42 30	40 10

Icebergs and field-ice were reported during May, 1885, as follows:

May 1st.—S. S. "Grecian Monarch," at 2 a. m., passed an iceberg in N. 42° 46', W. 42° 46'; bark "Moen" collided with an iceberg in N. 46°, W. 45°, and foundered; s. s. "Geiser," in N. 44° 30', W. 42° 9', passed a medium-sized iceberg.

2d.—S. S. "Grecian Monarch," at 5 p. m., in N. 42° 43', W. 49° 40', passed an iceberg; s. s. "Arracan," at 2 a. m., in N. 45° 18', W. 48° 00', entered heavy flocs of drift ice; at daylight sighted icebergs and was obliged to steer due south all day to clear them; counted more than one hundred large bergs.

4th.—S. S. "City of Chicago," in N. 45° 9', W. 41° 54', passed a large iceberg.

5th.—S. S. "Cilurnum" stove bow plates by collision with an iceberg in N. 45°, W. 47°.

6th.—S. S. "Furnessia," in N. 46° 52', W. 42° 54', passed an iceberg; also passed two bergs in N. 46° 20', W. 43° 48'; s. s. "Clintonia," in N. 43° 19', W. 47° 55', passed four large icebergs; s. s. "Prussian," in N. 44° 46', W. 44° 8', at 11.30 a. m. passed a large iceberg four miles to the southward; bark "Bayard" was abandoned after collision with an iceberg in N. 46°, W. 48°; bark "Magdalena," in N. 45°, W. 47° collided with an iceberg and was abandoned; s. s. "Circassian," from N. 47° 20', W. 42° 48' to N. 46° 38', W. 45° 21', passed three icebergs. Captain Lord, commanding the s. s. "Critic," reported: "on the 6th, at 6 a. m., in N. 48° 0', W. 47° 10', encountered a solid wall of ice extending as far as the eye could reach in a wnw. and sse. direction; steered southward and encountered numerous icebergs from two hundred to eight hundred feet high, and assuming the dimensions of large islands; got clear of ice in N. 44° 0', W. 49° 20'. In one hour's steaming at the rate of ten knots, we passed eighty-five icebergs; it was sixty hours from the time of sighting the ice until we got clear of it; the number of bergs must have gone into the thousands."

7th.—S. S. "Furnessia," in N. 43° 20', W. 48° 40', passed three icebergs; in N. 42° 50', W. 50° 0', passed another; s. s. "Servia," in N. 43° 34', W. 48° 45', passed ten icebergs; brig "Anne Christine," struck an iceberg and foundered on the Grand Banks. The s. s. "Circassian," in N. 45° 30', W. 47° 50', passed several large icebergs and much field-ice; got clear of field-ice and bergs in N. 43° 50', W. 48° 46'.

8th.—S. S. "Nevada," in N. 45° 28', W. 43° 20', passed an iceberg; s. s. "Dorset," in N. 42° 15', W. 50° 19', passed a large iceberg, also a small one; s. s. "Moravia," in N. 41° 40', W. 50° 16', at 4 p. m. passed two large pieces of ice; temperature of water, 34°; air 40°.

9th.—S. S. "Nevada," in N. 43° 0', W. 49° 34', passed several large and small icebergs; s. s. "St. Ronans," in N. 43° 20', W. 48° 10', passed an iceberg about one hundred and fifty feet high and several small bergs and pieces of ice close to the ship; temperature of water 32°; air, 34°. The bark "Oscar," in N. 43° 5', W. 45° 50', passed several large icebergs; s. s. "Wyoming," between N. 42° 44', W. 49° 50', and N. 43° 15', W. 48° 35', passed several large and small icebergs and many pieces of ice; s. s. "Circassian," encountered field-ice in N. 47° 50', W. 60° 54'; cleared field-ice on the 10th in N. 48° 26', W. 62° 17'; s. s. "Ontario," in N. 47° 22', W. 47° 55', passed through heavy field-ice and saw many bergs.

10th.—S. S. "Ontario," in N. 45° 50', W. 50° 6', passed through field-ice and saw large icebergs; s. s. "Mary Louisa," fell in with heavy ice, crushing her plates and causing vessel to founder in N. 49°, W. 46°.

The New York "Journal of Commerce" contained the following:

QUEBEC, May 10.—There are about two dozen steamers now due here, one, two, and even three steamers of some of the lines being behind time. Such an occurrence has hitherto been unknown in the history of this port. From all accounts, the ice in the Gulf is unusually heavy, and blocks the usual Gulf route to this port.

HALIFAX, May 11.—Advices from Saint John's, N. F., state that Captain Fairweather, of the sealing steamer "Terra Nova," reports the prevalence of an unusual number of icebergs drifting southward in the track of Atlantic steamers when crossing the Banks, and for two hundred miles east of them.

NORTH SYDNEY, C. B., May 13.—Steamer "Jeranos," from Rotterdam, for Montreal, has put into this port in distress, having been in collision with an

iceberg on the night of the 9th, knocking a hole in her bow. She passed numerous icebergs and field-ice between N. 47°, W. 46°, and N. 45°, W. 50°.

The "New York Herald" of May 10th published the following:

SAINT JOHN'S, N. F., May 9, 1885.—The mail steamer "Caspian," from Liverpool to Baltimore, arrived here this morning. Captain Barrett reports being forced to go down to the forty-fourth parallel to escape a vast belt of ice, two hundred and fifty miles wide, east and west, extending southward to the tail of the Grand Banks. Icebergs as low down as the forty-fourth parallel are simply innumerable, and are to be counted by hundreds.

11th.—S. S. "Venetian," between N. 43° 20', W. 50° 2', and N. 43° 35', W. 49° 20', from 11.45 a. m. to 2.45 p. m., passed sixty icebergs; Captain Trant reports: "eight of them were of large size, from one hundred to two hundred and thirty feet high, and from one-fourth to one-third of a mile long; a quantity were of moderate proportions, fifty to eighty feet high; remainder of various sizes, from ten to forty feet high. Except five, they were all south of us, from two miles to as far as the eye could reach, some in clusters together; apparently all clear to the northward, except the five above-mentioned, which were from three to five miles off; numerous small pieces were in their vicinity." The s. s. "Hammonia," in N. 42°, W. 50°, passed several large icebergs and some floating ice; also passed a large berg in N. 42° 9', W. 49° 37'.

12th.—The bark "Privateer" saw one large and five small icebergs in N. 45° 30', W. 45° 35'; s. s. "Rhein," in N. 43° 42', W. 49° 53', passed several large and small icebergs; s. s. "City of Richmond," in N. 42° 10', W. 50° 30' to 51° 30', passed numerous icebergs to the north and south; temperature of the water, 32°. The s. s. "Scythia," in N. 43° 52', W. 48° 48', at 10 a. m., passed a large iceberg; in N. 43° 28', W. 48° 30', passed another; from N. 43° 28', W. 49° 34' to W. 49° 53' passed through a chain of icebergs too numerous to count and extending north and south as far as the eye could reach, the greater part being to the southward; in N. 43° 24', W. 50° 41', passed four bergs of moderate size about five miles to the northward. The s. s. "Ontario" passed several patches of field-ice from Saint Paul island to Anticosti; after this no more field-ice was seen in the Gulf of Saint Lawrence; Captain Couch also reports: "from the 9th to the 12th had a continuation of dense fogs; passing numerous patches of field-ice, which compelled me to run to the southward from N. 48° 30', W. 46° 00', to N. 45° 00', and to stop for three nights." The s. s. "Venetian" in N. 45° 25', W. 45° 20', at 9 a. m., passed an iceberg about one hundred and fifty feet high.

13th.—S. S. "Adriatic," from N. 44° 09', W. 49° 16', to N. 43° 46', W. 50° 36', passed several icebergs; s. s. "Ems," in N. 41° 55', W. 51° 06', at 2.40 a. m., passed a large iceberg and another of medium size in N. 41° 55', W. 51° 16'; s. s. "Indiana," in N. 40° 54', W. 48° 24', passed a large iceberg; s. s. "Australia," in N. 40° 50', W. 48° 15', passed a large iceberg.

14th.—The bark "Privateer" was surrounded by icebergs in N. 43° 30', W. 50° 00'; counted twenty-three, some not more than a half mile distant; also passed many bergs during the night; saw no ice to the westward of longitude 52°. The s. s. "Elysia," in N. 43° 55', W. 49° 35', at 5.35 a. m., passed a large iceberg, also in N. 43° 46', W. 50° 29', passed two small bergs.

15th.—S. S. "Frisia," in N. 41° 24', W. 51° 10', at 7 a. m., passed several large icebergs; s. s. "Habsburg," in N. 41° 32', W. 51° 07', passed a large iceberg; in N. 41° 32', W. 51° 22', passed another. The s. s. "Gallia," between N. 43° 14', W. 49° 40', and N. 43° 0', W. 49° 57', passed through a group of icebergs, many of them being very large, also passed a very large berg in N. 42° 50', W. 50° 41'. Captain Murphy reports: "The temperature of the water fell to 32° Fahr., when abreast of the ice at a distance of about two miles; as the vessel moved away from the ice the temperature increased steadily, having risen in the evening, six hours after the lowest observed temperature, to 58° Fahr."

16th.—S. S. "Iowa," in N. 41° 41', W. 50° 54', at 11.35 a. m., passed six large icebergs, one being about one hundred and

fifty feet high and a quarter of a mile long; at 12.30 p. m., in N. 41° 41', W. 51° 9', passed a large berg.

17th.—S. S. "State of Indiana," in N. 42° 24', W. 50° 48', passed seven large icebergs and several small pieces; s. s. "P. Caland," in N. 41° 32', W. 48° 56', at 4 p. m., passed an iceberg; the lowest temperature of the water was 38° 5, air 51° 8, when about six miles to leeward of the iceberg. The bark "Betty," in N. 43° 35', W. 49° 26', passed several large icebergs.

18th.—S. S. "Neckar," in N. 40° 59', W. 48° 10', at 3.45 p. m., passed a medium-sized iceberg.

19th.—S. S. "City of Berlin," in N. 43° 30', W. 49° 30', at 3.35 a. m., struck an iceberg, carrying away bowsprit and head-work; saw two others near same position. The s. s. "Gellert," in N. 41° 7', W. 50° 12', saw two icebergs about fifty feet high and one thousand feet long.

20th.—S. S. "Britannic," in N. 44° 58', W. 49° 8', at 11 a. m., passed an iceberg.

21st.—S. S. "Normandie," in N. 42° 42', W. 47° 51', at 3.50 p. m. passed an iceberg; in N. 42° 13', W. 48° 47', at 6.45 p. m. passed another; in N. 42° 13', W. 50° 17', at 11.30 p. m. passed three bergs. S. S. "Hanoverian," between N. 48° 41', W. 45° 46', and N. 47° 19', W. 49° 5', sighted several icebergs, also several off Cape Pine; last berg was seen about fifteen miles west of Cape Pine; water 37°, air 43°. S. S. "Château Léoville," in N. 41° 30', W. 53° 0', from 9 a. m. to noon, passed three icebergs; s. s. "Austrian," in N. 43° 26', W. 48° 42', passed a large iceberg and two small ones; the temperature indicated the presence of others which could not be seen owing to fog.

22d.—S. S. "Aurania," in N. 42° 50', W. 50° 0', passed an iceberg.

23d.—S. S. "Wisconsin," between N. 43° 0', W. 48° 50', and N. 42° 44', W. 50° 40', passed fifty icebergs of large size and also many detached pieces; s. s. "Anchovia," in N. 42° 38', W. 50° 13', saw seven large icebergs and numerous small pieces; s. s. "Iberian," in N. 43° 29', W. 48° 34', at 6.45 p. m. passed a large iceberg, at 8 p. m. passed seventeen large bergs.

24th.—S. S. "Kansas," in N. 42° 20', W. 49° 50' to 50° 30', passed twenty-one large icebergs.

25th.—S. S. "Baltic," in N. 44° 9', W. 44° 30', passed an iceberg; s. s. "City of Rome," between N. 45° 0', W. 48° 20', and N. 44° 45', W. 49° 2', from 10.15 a. m. to 12.20 p. m., passed fifty-nine icebergs, ranging in height from thirty to eighty feet, besides numerous small pieces from three to five feet above water; s. s. "Zaandam," in N. 44° 9', W. 48° 35', passed an iceberg about three hundred feet high and half a mile long.

26th.—S. S. "Baltic," between N. 42° 30', W. 50° 0' and N. 42° 24', W. 51° 35', passed forty icebergs and numerous small pieces; s. s. "Boston City," in N. 44° 0', W. 43° 10', at 9.35 p. m., passed a large iceberg; soon after passed about twenty bergs; at 10 p. m., passed through fields of icebergs too numerous to count and continuing nearly all night; s. s. "Zaandam," between N. 42° 22', W. 48° 56' and N. 41° 44', W. 51° 00', passed twenty-six icebergs of large size; ship "E. B. Sutton," in N. 44° 20', W. 43° 7', passed a large iceberg.

27th.—S. S. "Celtic," in N. 44° 19', W. 47° 44', at 7.30 p. m., passed an iceberg; s. s. "Pavonia," between N. 42° 30', W. 49° 25' and N. 42° 30', W. 51° 20', from 6.30 a. m. to 12.40 p. m., passed through a group of large icebergs (about thirty), and many detached pieces; icebergs were visible about eight miles on both sides of the ship's course. The s. s. "State of Alabama," between N. 42° 50', W. 48° 43' and N. 42° 9', W. 51° 26', passed thirty-five icebergs; s. s. "Circassia," between N. 47° 47', W. 45° 54', and N. 46° 46', W. 48° 0', from noon of the 27th till noon of 28th passed numerous icebergs; s. s. "Lord Gough," between N. 43° 9', W. 48° 32' and N. 42° 44', W. 50° 21', passed several icebergs, some of them of large size; s. s. "Boston City," in N. 44° 0', W. 47° 0', at 1.30 a. m., passed a very large iceberg.

28th.—S. S. "Lord O'Neill," in N. 42° 0', W. 48° 0', passed one large and several small icebergs; s. s. "Marengo," in N. 42° 40', W. 50° 0', passed several icebergs; s. s. "Grecian," in N. 46° 0', W. 45° 0' to 49° 0', passed several icebergs and much small ice; s. s. "Elbe," between N. 42° 31', W. 49° 55' and N. 42° 30', W. 50° 7', passed two icebergs and several small pieces.

29th.—S. S. "Polynesian," in N. 41° 15', W. 47° 45', from 8 a. m. till noon passed five icebergs; ship "E. B. Sutton," in N. 42° 55', W. 46° 50', passed a large iceberg, also one in N. 42° 50', W. 47° 25'.

30th.—S. S. "Bohemia," in N. 42° 42', W. 40° 10', passed an iceberg from fifty to sixty feet high and two hundred feet long; s. s. "Llandaff City," between N. 43° 40', W. 48° 13', and N. 43° 25', W. 49° 53', sighted thirty icebergs; s. s. "St. Laurent," between N. 43° 35', W. 48° 25', and N. 43° 23', W. 51° 0' passed twenty-three icebergs and an ice field; s. s. "Wyoming," between N. 43° 39', W. 48° 25', and N. 43° 23', W. 50° 9', passed twenty-one large and small icebergs from 7.40 a. m. till 12.35 p. m.; at 3.45 p. m. in N. 43° 19', W. 51° 5', passed another large berg. The s. s. "Spain," in N. 43° 14', W. 45° 47', passed a small iceberg; in N. 43° 17', W. 45° 52', passed a very large berg; s. s. "State of Nevada," in N. 41° 24', W. 47° 52', passed an iceberg; s. s. "Jan Breydel," between N. 43° 7', W. 48° 32', and N. 42° 40', W. 51° 3', from 6 a. m. till 5 p. m. passed eighty-six large and several small icebergs; s. s. "Phoenician," between N. 43° 35', W. 48° 40', and N. 42° 40', W. 51° 15', from 3 a. m. to 3.30 p. m. passed through a field of icebergs; ice on both sides of the ship as far as the eye could reach; s. s. "Crystal," between N. 46° 30', W. 46° 0', and N. 45° 0', W. 49° 0', from 6 p. m. till 8 a. m., 31st, passed about sixty icebergs ranging from thirty to one hundred and twenty feet high; also many detached pieces. S. S. "Eider," in N. 40° 41', W. 48° 6', at 11.37 a. m. passed a medium-sized iceberg; also in N. 40° 44', W. 47° 48', at 0.45 p. m. passed another of moderate size; temperature of water, 57° 2.

31st.—S. S. "Tower Hill," between N. 43° 0', W. 49° 0', and N. 42° 30', W. 51° 0', passed from forty to fifty icebergs; ship "E. B. Sutton," between N. 42° 0', W. 49° 0' and N. 42° 16', W. 51° 30', passed a large number of icebergs, some very large: temperature of water 40° to 48°, air 44° to 52°; s. s. "Spain," between N. 41° 50', W. 48° 40' and N. 41° 20', W. 50° 45', passed thirty-one icebergs, ranging from forty to one hundred and fifty feet high, and from two hundred to two thousand feet long; s. s. "Palestine," in N. 44° 0', W. 48° 0' to 49° 20', passed several icebergs; s. s. "Wetherby," in N. 41° 36', W. 47° 15', at 5.50 p. m., passed several icebergs; at 11 p. m., in N. 41° 27', W. 48° 25', passed several; s. s. "Rhynland," in N. 41° 0', W. 47° 10', at 3.19 p. m., passed a large iceberg about twelve miles to the northward; at 7.30 p. m., in N. 40° 50', W. 48° 10', passed three small icebergs about eight miles to the northward; s. s. "Bohemia," in N. 41° 17', W. 46° 16', passed an iceberg from sixty to seventy feet high and two hundred feet long; also passed two others.

The following additional data are taken from the "Ice Reports," of the "International Nautical Magazine:"

4th.—S. S. "Colina," in N. 49° 57', W. 46° 20', passed two large icebergs to the nw., and in N. 49° 27', W. 48° 17', at 10 p. m., fell in with heavy field-ice, and had to retrace course to the eastward to get clear water.

5th.—S. S. "Colina," in N. 48° 51', W. 48° 18', at noon, heavy field-ice and bergs to the westward; steaming southward along the edge of the ice.

6th.—S. S. "Colina," in N. 48° 26', W. 46° 52', heavy field-ice and bergs to the westward, steaming to the se.; s. s. "Salier," in N. 47° 52', W. 45° 30', at 4 p. m., passed several detached bergs, but soon afterward encountered more, the number increasing rapidly so that they became uncountable. They were of all sizes, up to one hundred and fifty feet, and were interspersed with heavy ice-fields. Had to retrace our course to the eastward several times to get into

clear water. Skirted the ice for two days. Position at noon of May 7, N. 45° 30', W. 48° 01'; at 8 p. m. on the same day in N. 45° 0', W. 48° 30', were obliged to stop the engines for eight hours, being beset by the ice. Got clear of it finally on the 8th in N. 44° 0', W. 49° 20'.

7th.—S. S. "Colina," in N. 45° 40', W. 47° 44', at noon, in clear water; 1.30 p. m., weather foggy, steamed into straggling ice and bergs of various sizes; 2 p. m., dense fog and ice becoming heavy; had again to steer to the se., to get clear water.

8th.—Bark "Maggie L. Carvill," in N. 43° 50', W. 48° 40', saw large quantities of medium-sized icebergs and countless small pieces of ice, weather foggy; steered southward for one hundred miles to clear ice; bark "Linden" in N. 45° 00', W. 49° 00', at 10 a. m., encountered field-ice and bergs and continued to pass them until May 9th, in N. 43° 00', W. 51° 00'. Had to steer sse. about ten miles to clear a sheet of field-ice; s. s. "Colina," in 44° 10', W. 50° 49', passed through a quantity of floe ice; s. s. "Jersey City," from N. 43° 37', W. 49° 54', at 5 a. m. to N. 43° 25', W. 50° 37', at 8 a. m., passed innumerable small pieces of ice.

9th.—Bark "Hassel," in N. 46° 50', W. 45° 10', at 2 p. m., passed an iceberg about thirty feet high; sailed in thick fog until May 10th, in N. 45° 45', W. 47° 20', when we saw thirty bergs, ranging from twenty to one hundred feet high. On May 11th, in N. 44° 29', W. 50° 18', weather clear, passed more than two hundred large icebergs and much small ice, reached clear water in N. 44° 19', W. 51° 00'; bark "Brilliant," in N. 45° 50', W. 48° 46', sighted numerous icebergs and ran into field-ice and remained fast for six hours, afterward sailed nw. by n. for one hundred and twenty miles along field-ice, and at 4 a. m. on the 11th, in N. 46° 05', W. 50° 25', got clear of ice; s. s. "Titania," at 1.30 a. m., ran into a field of ice and stopped for daylight, 4 a. m., began to force a passage through the ice; 7 a. m., ice becoming thicker, forced a passage through heavy field-ice until 4 p. m., dense fog all the time; at 10.30 p. m., had to stop engines until 2 a. m. the next morning. Ship's position at noon N. 48° 28', W. 49° 37'.

10th.—The s. s. "Colina" encountered large quantities of field and straggling ice in the Gulf of Saint Lawrence and remained fast for nine hours, after which we got clear and proceeded on our voyage; s. s. "Titania," at 10.30 a. m., off Cape Race, passed several detached bergs and continued to pass occasional icebergs, some of them very large, until midnight.

11th.—Bark "Speranza," in N. 41° 41', W. 47° 40', passed one large iceberg, and, in N. 41° 40', W. 48° 10', passed one large and one small berg; s. s. "Titania," in N. 47° 35' W. 59° 37', at noon; from 4 p. m. till midnight, passed through quantities of scattered field-ice.

12th.—Bark "Speranza," in N. 41° 38', W. 49° 40' passed a large iceberg.

13th.—Ship "Columbia," in N. 41° 39', W. 51° 00', at 8 a. m., passed an iceberg two hundred and fifty feet high; from this position to N. 41° 35', W. 52° 50', saw seven large icebergs, ranging from forty to one hundred and fifty feet high, and a number of small pieces. Temperature of the air varying from 60° to 50° when nearing the bergs; temperature of water falling from 50° to 30° when passing them. The s. s. "Suffolk," in N. 47° 0', W. 46° 0', had alternately foggy and clear weather; saw a great number of very large icebergs and some small ice. Our progress was greatly impeded up to May 15th when we sighted the last twelve bergs in N. 45° 20', W. 50° 38'; approaching the Gulf of Saint Lawrence the weather cleared and we passed quantities of small ice to the northwest of Bird Rocks. Ship "Rence," in N. 42° 0', W. 50° 0', saw an iceberg three-quarters of a mile long and one hundred and fifty feet high.

14th.—Ship "Rence," in N. 41° 20', W. 53° 00', passed ten bergs of various sizes; thick fog prevailing.

17th.—S. S. "India," in N. 41° 44', W. 48° 12', at 4 p. m. saw a large iceberg about sixty feet high and about three hundred feet long; at the same time saw a small berg about four miles to the northward.

18th.—S. S. "Galileo," in N. 42° 49', W. 47° 15', passed a medium-sized iceberg

21st.—S. S. "Westphalia," in N. 41° 41', W. 49° 58', at 1.15 p. m. passed an iceberg about two hundred feet high and five hundred feet long.

23d.—S. S. "Surrey," in N. 43° 34', W. 48° 44', at 10.30 p. m. passed the first iceberg about one hundred feet high and two hundred feet long; passed innumerable bergs until 3.30 a. m. of the 24th, when several icebergs of various sizes were seen between N. 43° 16', W. 50° 1', and N. 43° 4', W. 50° 46'.

24th.—S. S. "Werra," in N. 41° 30', W. 48° 27', at 4 a. m. saw two icebergs, each about one hundred feet high and three hundred feet long; in N. 41° 30', W. 49° 25', at 6 a. m. saw nine bergs of various sizes, and in N. 41° 42', W. 50° 56', at noon saw one large berg about two hundred feet high.

26th.—S. S. "Suevia," in N. 44° 12', W. 43° 24', at 1.05 p. m. passed a large berg about eighty feet high and one thousand feet long, and in N. 44° 8', W. 43° 34', passed a medium-sized berg.

SIGNAL SERVICE AGENCIES.

Signal Service agencies have been established in the Maritime Exchange buildings at New York and Philadelphia and in the Custom-house at Boston, where the necessary blanks and other information will be furnished to shipmasters. In the January REVIEW was published an explanation of the object of these agencies.

In pursuance of the arrangements made with the meteorological office of London, England, there were, during May, 1885, sixteen reports cabled to that office from New York, concerning storms and icebergs encountered by vessels on the Atlantic west of the forty-fifth meridian. Three messages were sent from the agency at Boston.

TEMPERATURE OF THE AIR.

[Expressed in degrees, Fahrenheit.]

The distribution of mean temperature over the United States and Canada is exhibited on chart ii. by the dotted isothermal lines; and in the table of miscellaneous meteorological data are given the means for the various stations of the Signal Service.

In the following table are given the mean temperatures for the several geographical districts with the normals and departures, as deduced from the Signal Service observations:

Average temperatures for May, 1885.

Districts.	Average for May. Signal-Service ob- servations.		Comparison of May, 1885, with the average for several years.
	For sev- eral years.	For 1885.	
	0	0	0
New England.....	54.9	53.1	— 1.8
Middle Atlantic states.....	61.5	59.3	— 2.2
South Atlantic states.....	70.0	69.1	— 0.9
Florida peninsula.....	76.7	75.8	— 0.9
Eastern Gulf states.....	72.6	70.2	— 2.4
Western Gulf states.....	73.3	71.2	— 2.1
Rio Grande valley.....	80.1	76.2	— 3.9
Tennessee.....	68.9	65.8	— 3.1
Ohio valley.....	65.0	62.6	— 2.4
Lower lake region.....	57.2	55.5	— 1.7
Upper lake region.....	51.3	48.5	— 2.8
Extreme northwest.....	52.4	51.7	— 0.7
Upper Mississippi valley.....	62.7	60.1	— 2.6
Missouri valley.....	59.2	58.1	— 1.1
Northern slope.....	52.4	52.1	— 0.3
Middle slope.....	59.6	56.8	— 2.8
Southern slope.....	70.8	66.4	— 4.4
Southern plateau.....	66.6	66.1	— 0.5
Middle plateau.....	55.2	55.8	+ 0.6
Northern plateau.....	56.8	58.4	+ 1.6
North Pacific coast region.....	55.0	57.0	+ 2.0
Middle Pacific coast region.....	59.2	61.2	+ 2.0
South Pacific coast region.....	66.6	68.3	+ 1.7
Mount Washington, N. H.....	33.5	36.1	+ 2.6
Pike's Peak, Colo.....	21.9	21.1	— 0.8

The mean temperature, as shown in the table of averages for the several districts, has been below the normal in every